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10/784,763	02/23/2004	Jayesh Jasapara	3-7	2221

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EXAMINER

ANDERSON, DENISE BROWN

ART UNIT PAPER NUMBER

2877

DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/784,763

Applicant(s)

JASAPARA ET AL.

Examiner

Denise B. Anderson

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11, 13-18 and 20-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-15, 18, and 23 is/are rejected.
- 7) ☒ Claim(s) 16, 17 and 20-22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Summary

Examiner acknowledges applicant's amendments to the drawings and claims filed on 5/26/06. The examiner accepts the new, corrected drawings. Examiner respectfully suggests that applicant address outstanding claim objections from the previous Office Action, as described below.

Claim Objections

Claims 17 and 18 are objected to because of the following informalities:

As to claim 17, the recitation ["the method is used to measure the characteristic of eccentricity between the optical fiber and an outer coating layer"] has not been given patentable weight because the recitation occurs in the preamble.

As to claim 18, the recitation ["the method is used to measure the characteristic of the presence of unwanted sub-surface features"] has not been given patentable weight because the recitation occurs in the preamble.

A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 5, 9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712) and further in view of Knuttel (DE 102-07-186.1).

As to claim 1, Venkatesh et al discloses, in figure 1, a broadband lightwave source (low coherence source 12); an optical beamsplitter (coupler 16) with 2 input and output arms; one input arm coupled to the low coherence source 12; a lensing arrangement consisting of a single lens 27 connected to an output arm of coupler 16 for directing light to the optically transparent object (thin film 15); and an optical spectrum analyzer, which serves as a spectrometer and provides the Fourier transform of the frequency domain spectrum (column 3, lines 19-25 and column 5, lines 28-31) and the signal peaks are related to the material thickness (column 4, lines 22-34).

Venkatesh et al does not expressly disclose generating the fast Fourier transform. The examiner takes Official Notice of the fact that fast Fourier transforms are known to be used with spectral analysis. The fast Fourier transform is an algorithm to more efficiently perform the Fourier transform. It would have been obvious to one having ordinary skill in the art at the time of invention to incorporate the fast Fourier

transform into the invention of Venkatesh et al, since its use was well known and it provides a more efficient method of analyzing the spectrum.

Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice. Applicant must seasonably challenge well known statements and statements based on personal knowledge when they are made by the Board of Patent Appeals and Interferences. In re Selmi, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); In re Fischer, 125 F.2d 725, 52 USPQ 473 (CCPA 1942). See also In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971) (a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice). If applicant does not seasonably traverse the well-known statement during examination, then the object of the well known statement is taken to be admitted prior art. In re Chevenard, 139 F.2d 71, 60 USPQ 239 (CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Thus, applicant is charged with rebutting the well-known statement in the next reply after the Office action in which the well known statement was made.

As to claims 1 and 5, Venkatesh et al does not expressly disclose first collimating and then focusing the test signal. Knuttel discloses, in figure 1, lens 14 for collimating the beam and lens 15 for focusing the beam onto object 18. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the single lens 27 in Vakatesh et al with the lens arrangement 14,15 in Knuttel for the purpose of collimating and refocusing light from a fiber an onto an object.

As to claim 9, Venkatesh et al does not expressly disclose a 50:50 beam splitter. The beam splitting ratio can be adjusted to a variety of numbers (90:10, 50:50, etc.) to suit the particular application. In this case, the desire is to achieve equal intensity beams. It would have been obvious to one of ordinary skill in the art at the time of the invention to make design coupler 16 to be a 50:50 beam splitter in figure 1 of Venkatesh et al for the purpose of obtaining equal intensity signals in the 2 output arms, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)..

As to claim 11, Venkatesh et al discloses a continuum wave laser source—low coherence source 12 in figure 1 is a light emitting diode (column 4, lines 4-5).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712) and Knuttel (DE 102-07-186.1), as applied to claim 1 above, and further in view of Inaba et al (JP 10311708).

As to claim 2, the applicant further claims measuring the thickness, filtering peaks in the FFT and applying the inverse FFT. Venkatesh et al discloses measuring the thickness of the thin film 15 (see title). Venkatesh et al does not expressly disclose filtering peaks of the FFT and computing the inverse FFT. Inaba et al disclose, in figure 1, a method for more accurately determining thickness by taking the FFT (20), filtering the FFT signal (22) and taking the inverse FFT (24). See also the abstract. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the filtering method of Inaba et al on the optical spectrum in Venkatesh et al for the purpose of improving the accuracy of the thickness measurement.

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712), and Knuttel (DE 102-07-186.1), as applied to claim 1 above, and further in view of Wang et al (USPN 6,961,123).

As to claims 3 and 4, the applicant claims a polarizer element, a polarization beam splitter. Venkatesh et al does not expressly disclose a polarizer element. Wang et al discloses a polarizer element (polarization beam splitter 51 in figure1). Combining polarization sensitive data with OCT data can reveal additional information about an object under investigation (column 1, lines 23 – 32). It would have been obvious to one of ordinary skill in the art at the time of the invention to include a polarizer element from Wang et al in the path of the reflected light from the thin film in Venkatesh et al for the purpose of achieving improved resolution and/or acquiring additional information about the object.

Further as to claim 4, the applicant claims a second spectrometer. Venkatesh et al does not expressly disclose a second spectrometer. One spectrometer has been used to collect light reflected from the object. With 2 polarization states, a separate spectrometer would be needed to collect light with the 2nd polarization state. It would have been obvious to one having ordinary skill in the art at the time of the invention to include an additional spectrometer in the invention of Venkatesh et al, Knuttel, and Wang et al for the purpose of collecting an additional signal of different polarization, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712), Knuttel (DE 102-07-186.1), and further in view of Nishimura et al (*IEEE Journal of Selected Topics in Quantum Electronics*; September/October 1999; Vol. 5; No. 5; pp. 1260-1265).

As to claims 6, 7, and 8, Venkatesh et al and Knuttel do not expressly disclose an in-fiber beam expander, a fiber tip collimator, or an in-fiber lensing element. Nishimura et al discloses fiber tip collimators (claim 7), in-fiber beam expanders (claim 6), and in-fiber lensing elements (claim 8). See page 1260, left column, paragraphs 1 and 2. It would have been obvious to one of ordinary skill in the art at the time of the invention to include a beam expander at the output of output arm 14 in figure 1 of Venkatesh et al for the purpose of expanding the mode spot size. Regarding claims 7 and 8, it would have been obvious to one of ordinary skill in the art at the time of the invention to include a fiber tip collimator or in-fiber lensing element at the output of output arm 14 in figure 1 of Venkatesh et al for the purpose of increasing coupling efficiency or reducing beam divergence.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712), Knuttel (DE 102-07-186.1), and Nishimura et al (*IEEE Journal of Selected Topics in Quantum Electronics*; September/October 1999; Vol. 5; No. 5; pp. 1260-1265), as applied to claim 8 above, and further in view of Jauncey et al (*Optics Letters*; march 1997; Vol. 12, No. 3, p. 164-165)

As to claim 10, Venkatesh et al does not expressly disclose an Er-doped fiber lightwave source. Jauncey et al discloses an Erbium-doped fiber laser source. A variety

Art Unit: 2877

of laser sources are used based on individual applications. Er-doped fiber lasers are useful for providing short pulses at high peak powers. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the low coherence source 12 in figure 1 of Venkatesh et al with the Erbium-doped laser of Jauncey et al for the purpose of generating high peak powers and low losses.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712) and Knuttel (DE 102-07-186.1), as applied to claim 1 above, and further in view of Jacobson et al (USPN 6,661,502).

As to claim 13, Venkatesh et al does not expressly disclose that the optically transparent object is an optical fiber. Jakobsen et al discloses a fiber 14 in figures 1 and 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the thin film 15 in figure 1 of Venkatesh et al with the fiber 14 in figure 1 of Jakobsen et al for the purpose of measuring a different object.

Claims 14 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712) and further in view of Jakbson et al (USPN 6,661,502).

As to claim 14, the features that the applicant claims are contained within claim 1, except for illuminating the fiber in a perpendicular direction. Venkatesh et al does not expressly disclose illuminating the fiber in a perpendicular direction. Jakobsen et al discloses a method and apparatus for measuring diameter of an optical fiber. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the thin film 15 in figure 1 of Venkatesh et al with the fiber of Jakobsen et al and

illuminate it in a perpendicular direction for the purpose of achieving reflected light in a specified direction.

As to claim 23, Venkatesh et al discloses an optical cavity created by reflectors 25 and 26 in figure 1, and the thin film disposed between the reflectors. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace (between reflectors 25 and 26) the thin film 15 of Venkatesh et al with the fiber of Jakobsen et al for the purpose of measuring the thickness of a different object.

Claims 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712) and Jakobson et al (USPN 6,661,502), and further in view of Inaba et al (JP 10311708).

As to claim 15, the applicant further claims filtering peaks in the FFT and applying the inverse FFT in a cosine form. Venkatesh et al discloses measuring the thickness of the thin film 15 (see title). Venkatesh et al does not expressly disclose filtering peaks of the FFT and computing the inverse FFT. Inaba et al disclose, in figure 1, a method for more accurately determining thickness by taking the FFT (20), filtering the FFT signal (22) and taking the inverse FFT (24). See also the abstract. Inverse FFT's can be transformed into a cosine or sine function – both sinusoidal functions being related in phase. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the filtering method of Inaba et al on the optical spectrum in Venkatesh et al for the purpose of improving the accuracy of the thickness measurement.

As to claim 18, the applicant further claims recognizing unwanted peaks in the FFT. Venkatesh et al, Jakobsen et al and Inaba et al do not expressly disclose recognizing unwanted peaks in the FFT. However, the purpose for filtering is to get rid of unwanted peaks, improving the accuracy of the signal as described by Inaba et al. It would have been obvious to one of ordinary skill in the art at the time of the invention to recognize and get rid of unwanted peaks in the spectrum of Venkatesh et al using the filtering method of Inaba et al for the purpose of improving the accuracy of the thickness measurements.

Allowable Subject Matter

Claims 16-17 and 20-22 are allowable.

Claims 16-17 and 20-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 16 is allowable because the prior art of record fails to disclose or render obvious re-orienting and comparing sets of measurement (i.e., as opposed to measurement and reference data) results in combination with the rest of the limitations of the claims.

Claims 17 and 22 are allowable because the prior art of record fails to disclose or render obvious comparing sets of results with respect to polarization differences and calculating for each a Fourier transform and comparing the results associated with a thickness in combination with the rest of the limitations of the claims.

Claim 20 is allowable because the prior art of record fails to disclose or render obvious using a micro-structured optical fiber (photonic crystal) with regularly arranged holes and a spectrometer and Fourier transform for measuring size and distribution of air holes in the fiber in combination with the rest of the limitations of the claims

Claim 21 is allowable because it depends from claim 20.

Response to Arguments

Applicant's arguments, see page 10, filed 5/26/06, with respect to the rejection(s) of claim(s) 2 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Inaba et al (JP 10311708). As to claim 2, the applicant further claims measuring the thickness, filtering peaks in the FFT and applying the inverse FFT. Venkatesh et al discloses measuring the thickness of the thin film 15 (see title). Venkatesh et al does not expressly disclose filtering peaks of the FFT and computing the inverse FFT. Inaba et al disclose, in figure 1, a method for more accurately determining thickness by taking the FFT (20), filtering the FFT signal (22) and taking the inverse FFT (24). See also the abstract. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the filtering method of Inaba et al on the optical spectrum in Venkatesh et al for the purpose of improving the accuracy of the thickness measurement.

While examiner does not concede to arguments made by applicant with respect to claim 15, new grounds of rejection are made in view of Inaba et al (JP 10311708), as

explained above for claim 2, because the same features of claim 2 are also found in claim 15.

Applicant's arguments filed on 5/26/06 have been fully considered but they are not persuasive with regard to claims 1, 3-11, 13-14, 18, and 23. Applicant's sole argument for these claims is that the reference Venkatesh et al requires the additional use of a reflector to carry out the measurements, instead of using only those structural elements of claim 1: namely, a broadband source, beam splitter, lensing arrangement, and spectrometer. Examiner notes that applicant has used an open-ended transitional phrase "comprising" to claim the invention. As such, relevant prior art may include additional features, besides those claimed by applicant, and still read on applicant's invention. If applicant wishes to exclude other features, such as a reflector, it would be necessary to claim applicant's invention using a close-ended transitional phrase, such as "consisting of" or specifically indicate in the claims that this feature must be absent. See MPEP § 2111.03.

Fax/Telephone Information

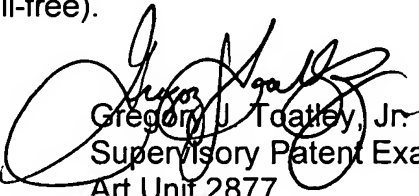
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise B. Anderson whose telephone number is 571-272-8324. The examiner can normally be reached on Mon-Fri (9:30 AM - 6 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2877

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Denise B. Anderson, Ph.D.
Patent Examiner
Art Unit 2877


Gregory J. Toatley, Jr.
Supervisory Patent Examiner
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22 June 06

DBA 
Date Signed: 6/12/06